Hundreds of Paper Clips

What Happens

Students use boxes of paper clips to represent groups of 100. They combine hundreds into thousands and work on recognizing the words and numerals for these numbers. During Choice Time, students work on Paper Clip Problems, in which they subtract small amounts from multiples of 100; write their own Paper Clip Problems; and explore Related Problem Sets—groups of related problems in which the solution to one problem is used to help solve others. Student work focuses on:

- combining hundreds
- reading and writing hundreds and thousands
- adding to and subtracting from multiples of 100

Ten-Minute Math: Estimation and Number Sense Continue doing this activity during any spare ten minutes you have outside of mathematics class. Use subtraction problems, such as 94 – 36 or 127 – 83. Write the problems in standard notation, both vertically and horizontally, so that students get used to interpreting both forms. You may also want to put the problems in contexts that students have used in this unit: bean handfuls, weights, or ages.

Emphasize use of landmarks, such as multiples of 10 (36 to 40 is 4, 40 to 90 is 50, 90 to 94 is 4), as well as counting by 10's (46, 56, 66, 76, 86, 96, that's 60, go back 2 is 58) as students solve these problems.

For more information on this activity, see p. 73.

Materials

- Boxes of paper clips or alternative material in 100's (1 per student)
- Cubes, 100 charts, and 300 charts
- Calculators
- Overhead projector
- Quick Image Paper Clip Boxes (transparency)
- Prepared envelopes or resealable plastic bags containing Paper Clip Problems and Related Problem Sets, already cut apart for classroom use
- Colored pencils, markers, or crayons
- Paste or glue sticks
- Student Sheet 14 (1 per student, homework)

Activity

Quick Images: How Many Paper Clips?

Hold up a box of paper clips. Show students the side of the box where it says there are 100 paper clips in a box. Then explain:

I'm going to show some groups of paper clip boxes on the overhead. Your job is to figure out how many paper clips there are in each group of boxes. I'll show the picture of each group for only a few seconds. Then you make an estimate of how many paper clips are in the group.

After you describe what you saw, I'll show you the picture again to check your memory. Remember that these boxes are full, and that each box always has 100 paper clips.

Show the pictures from the transparency, Quick Image Paper Clip Boxes, one at a time, starting with the group of three boxes. Show each image for about three seconds, then have students write down what they saw and how many paper clips they think are in the display.

Afterward, ask students to talk about how the boxes were arranged, the number of boxes shown, and what this means about the total number of paper clips. After students have had a chance to describe and discuss what they saw, show the image again for students to check their memories. Again, ask them to describe what they see this time. Have a student come up and show how he or she figured out how many clips there are in the display.

As the number of boxes in the display gets larger, the class will need to talk about how to read and write numbers in the hundreds. For each display, ask students how to write the number and how they would say it. If someone says "ten hundred" for a thousand, acknowledge that there are ten hundreds and ask if anyone knows the special name for ten hundreds. As you move up to higher numbers in the next activity, encourage the use of both "seventeen hundred" and "one thousand seven hundred."

Activity

Combining, Then Subtracting

Counting by 100's Pass out one box of paper clips (or other group of 100 items, or copies of 100 charts) to each student. Remind them that there are 100 clips in each box (or 100 squares on the 100 chart). Ask some questions that involve combining the boxes, using students and groups in your own class to make these questions interesting. Try to use some small combinations and some larger combinations. For example:

- If Khanh, Laurie Jo, Aaron, and Saloni put their boxes of clips together, how many would they have?
- If all the students who wear glasses put their boxes of clips together, how many would they have?
- How many paper clips do all the girls in the class have in their boxes?
- If all the boys in the class combined their boxes, how many would they have?
- How many clips do all the boxes have?

With some of these questions, students will combine hundreds until they move into the thousands. Encourage them to count up by 100 to get to the appropriate number and to name these numbers in more than one way.

Subtracting from Hundreds Repeat one of the problems that you have just been working on that resulted in a small number of hundreds—300, 400, or 500 works well. Tell students to listen carefully to the next step in this problem, which is to subtract a small number of paper clips from the total.

We've figured out that the total number of clips is 300. Now imagine that I need to use some of those clips. I need 3 of the paper clips to put some papers together. [*Take 3 clips out of one of the boxes.*] With your partner, figure out how many paper clips there are now.

Give students time to work on this problem in pairs. Encourage them to use any strategies they can to figure out how many are left. Make sure that they have counting materials and calculators. They should write down their numbers and keep notes on the method they used.

Discuss what students found and how they found it. Encourage students to think about what 1 less than 300 is, then 2 less than 300, and 3 less than 300. Counting backwards by 1's, either on paper or with a calculator, is a very useful strategy for this problem.

Depending on how your students do with this problem, do one or more similar problems with the group. Make sure that students see several methods their classmates have devised, or demonstrate them yourself. For example:

- Put together three 100 charts. Mark off 3 from the last one. Now you can see there are 100 plus 100 plus 97 (from the last chart).
- Put together 300 interlocking cubes. (This is not too time-consuming if the cubes are stored in tens.) Take 3 away. Count up how many are left.
- Count backwards mentally from 300. Take one away, that's 299. Take another away, that's 298. Take another away, that's 297.
- Count backwards on the calculator. Put 300 on the calculator. Subtract 1. Subtract 1. Subtract 1. Then press the equals sign.

Some students understand the principle of subtracting, but are unsure of the number sequence when they are counting backwards. Using the calculator as described in the last example will help them become familiar with how the backwards number sequence looks.

Activity

Choice Time: Working with Hundreds

Three Choices During the rest of Sessions 3 and 4, students choose from three activities that are going on simultaneously in the classroom. Students should try each activity sometime during the two sessions, but they need not complete all the problems within an activity. They may go back to an activity during Session 4, but they should try different problems within the activity the second time through.

As you circulate, observe whether the size of the numbers in the problem seems to be at the right level of challenge for each student. If not, you can easily adapt the problems by making the numbers larger or smaller.

How to Set Up the Choices If you set up the activity choices at centers, show students what they will find at each one. Otherwise, make sure students know what materials they need and where to get them.

Choice 1: Paper Clip Problems—envelopes or resealable plastic bags with Paper Clip Problems; paste or glue sticks; cubes, 300 charts, and calculators

Choice 2: Create Your Own Problems—cubes, 300 charts, and calculators; drawing paper; colored pencils, markers, or crayons

Choice 3: Related Problem Sets—envelopes or resealable plastic bags with Related Problem Sets; paste or glue sticks; cubes and 300 charts (no calculators for these problems)

Choice 1: Paper Clip Problems

Students choose one of the Paper Clip Problems and paste or glue it onto a piece of paper or into their mathematics folder or notebook. They then work in pairs to solve the problem and write about how they solved it. If students are working with problems that are either too hard or too easy for them, help them choose a problem that is more appropriate.

❖ **Tip for the Linguistically Diverse Classroom** Pair students of varying English proficiency. Those who are not writing comfortably in English can use a combination of numerals and drawings to tell how they solved the problems.